



Mechanical Engineering Department

University of Tabuk

Quality Assurance Manual

By

Academic Accreditation Development and Quality Committee

(2022-2025)

February 2022

Message from Chairman

The Mechanical Engineering (ME) Department was established in fall, 2010-2011 where students participate in a general engineering curriculum in 2011-2012. The duration of study is five years, which includes a preparatory year, after which the student obtains a bachelor of science degree in Mechanical Engineering upon successful satisfaction of program criteria and completion of university requirements. The program serves the goals of Kingdom of Saudi Arabia's development plan for preparing graduates to fit in different job sectors that serve the Saudi society. Most of the graduates are already employed in various public and private sectors. Program has a mission well aligned with the university and has been following international and national standards to improve the quality of education. Program is awarded with ABET accreditation in 2018.

The ME program offers state of the art courses to satisfy the labor market of the region and meeting the international benchmarks. The program is committed to ensure the quality in its teaching and learning processes, administration, learning environment, support services, research, and community services. Stakeholders' involvement is ensured for the continuous quality improvement of the program. Policies and initiatives are implemented through various committees and sub committees at program. This manual developed by the Accrediaion, Quality, and Development is a primary tool to ensure that university/college philosophy of quality is fully disseminated and implemented at program level.

Terms and definitions

Quality:

It is satisfying the requirements of the customer who invested in the product or service and it is about being fit for the purpose for which the product or service was purchased.

Academic quality:

Academic quality is a way of describing how well the learning opportunities available to students help them to achieve their awards. It is also about making sure that appropriate and effective teaching, support, assessment and learning opportunities are provided for them.

Academic standards:

Academic standards are a way of describing the level of achievement that a student must reach to gain an academic award (for example, a degree). It should be at a similar level across the Kingdom.

Quality assurance (QA):

Quality assurance refers to a range of review procedures designed to safeguard academic standards and promote learning opportunities for students of acceptable quality.

Quality system:

A quality system, also known as a Quality Assurance (QA) system or a Quality Management System (QMS), is a management system that helps to ensure the consistency of quality of the goods or services (education) that are supplied. Compliance with Quality System Standards is demonstrated by completion of a successful quality system audit conducted by a certified organization recognized by the Government which is in our case: The National Commission for Academic Accreditation & Evaluation (NCAAA).

Policies:

A policy is a statement stated to guide decision-making based on the framework of the institution's objectives, goals, and management trends.

Procedures:

A procedure is a "documented process": a series of prescribed steps which are followed in a specific regular order to secure adherence to the guidelines set in the policy the procedure adheres to. It describes the process: "who" does "what" and "when" "under what criteria" in a specific sequence.

Activity/ Task:

These are work instructions that describe how to accomplish the process. An activity is an action representing a step in the procedure. A task is a detailed description of an activity.

Forms:

These are documentations used to create records, checklists, surveys; which constitute the basis of the process communications, audit materials, and process improvement initiatives.

Records:

These are the critical output documents of any procedure

Abbreviations

UT	University of Tabuk
ME	Mechanical Engineering
NCAAA	National Commission for Academic Accreditation & Evaluation
KPI	Key Performance Indicator
PEO	Program Educational Objectives
PO	Program Outcomes
PLOs	Program Learning Outcomes
KSA	Kingdom of Saudi Arabia
NQF	National Qualification Framework KSA
TQM	Total Quality Management
APR	Annual Program Report
PES	Program evaluation survey
CES	Course evaluation surveys
SES	Student experience survey
AES	Alumni Evaluation survey
EES	Employer Evaluation survey
LRSS	Learning Resources Satisfaction Survey

Contents

- Message from Chairman 2**
- Terms and definitions 3**
- Abbreviations..... 5**
- 1. Introduction 7**
- 2. Vision, Mission, and Outcomes 8**
- 3. The organizational Structure 11**
- 4. The quality Philosophy 13**
- 5. Program Quality Assurance and Review Cycle..... 19**
- 6. Key Performance Indicators (KPIs) and Benchmark..... 26**
- 7. Benchmarking and Improvement Cycle 32**
- 8. Stakeholders Surveys 33**

1. Introduction

The Faculty of Engineering in University of Tabuk (UT) is committed to continuous quality improvement on all fronts. Since its establishment, the Mechanical Engineering program has been adopting UT established practices regarding total quality management (TQM).

The purpose of this quality manual is to:

- Serve as a summarized source of information for the engineering program quality assurance.
- Highlight the important quality management policies, guidelines and procedures which support the ME program in its goals.
- Ensure the quality of practices in all domains, the achievement of the program mission and goals and for program accreditation.

Since Mechanical Engineering Program derives all its guidance including policies and procedures, quality practices and systems from the university, this manual has been drafted using the university's manual as a guide.

2. Vision, Mission, and Outcomes

Mission of The University of Tabuk

To offer a distinguished university education that meets the needs of society and the job market through an attractive educational, administrative, and technical environment that supports research and innovation

Mission of the Faculty of Engineering

To graduate qualified engineers in accordance with the International Academic Standards and prepare them to meet the changing needs of society. These graduates will be able to compete locally and internationally. The Faculty of Engineering is committed to providing excellent education and pursuing relevant scientific research and partnership with industry and governmental societies.

Mission of the Department of Mechanical Engineering

The mission of the Department of Mechanical Engineering which stems from the mission of the Faculty of Engineering of Tabuk University is to provide high quality education in mechanical engineering to be professionally equipped engineers in the fields of Energy and Thermo-Fluid Engineering, Mechanical Systems and Design, Engineering Materials and Manufacturing, and Mechatronics and Controls, and promotes excellence, ethics and welfare of society.

The mission of the department of Mechanical Engineering is consistent with the mission of the faculty and the university in community service, high quality education and scientific research.

Program Educational Objectives (PEOs) or Program Outcomes

Program Educational Objectives (PEOs) or Program Outcomes are broad statements that describe what graduates are expected to attain within five years of graduation. The PEOs support the mission of the institution and are based on the needs of the program's

constituencies.

The ME Program Educational Objectives (PEOs) describe what graduates are expected to attain within a few years of graduation. The department has established three broad program educational objectives (PEOs) for graduates as they progress through their careers:

1. PEO 1: Career Contribution and Advancement: Through their ability to solve engineering problems, meaningful design and hands-on experience, critical thinking skills, and training in teamwork and communication, graduates will make significant contribution to their chosen field and advance professionally in mechanical engineering or allied disciplines.
2. PEO 2: Professionalism: Graduates will act with both professional and social responsibility in their career field, including a commitment to protect both occupational and public health and safety, and apply ethical standards related to the practice of engineering.
3. PEO 3: Life-Long Learning: Graduates will understand that their undergraduate education was just the beginning of their training, and will continue to develop their knowledge and skills through progress toward or completion of graduate education, and/or professional development through short courses or seminars, and/or professional certification, and/or participation in professional societies.

The mission of the University of Tabuk (UT) emphasizes standard quality education, community service and scientific research. Three Mechanical Engineering Program PEOs support UT's mission. The achievement of mission is assessed through direct and indirect measurements, its analysis and benchmarking which include analysis of Program Learning Outcomes (PLOs) and program Key Performance Indicators (KPIs).

ME Program Goals

1. To deliver distinguished academic education that meets the needs of the labor market.
2. Providing creative research to contribute to building the knowledge economy.
3. Effective contribution to sustainable development and community service.
4. Offer a stimulating and attractive educational environment.
5. Develop an effective administrative and organizational environment in the ME department.

Program learning Outcomes (PLOs)

The ME department has adopted the ABET EAC Criterion 3 Program learning outcomes PLO (1) to PLO (7) with adding PLO (8) as its PLOs. PLOs are the knowledge, skills, and capabilities students should be able to demonstrate by the time of graduation. The definition and revision of the PLOs of the ME Program are discussed and approved in the ME Department Council, which includes all ME faculty members. Table 3-1 lists the ME program's PLOs.

Table 3-1: ME Program learning Outcomes

DOMAIN	PLO code	Knowledge and understanding
K	K1	An ability to demonstrate knowledge of concepts of Mechanical engineering and science
		Skills
S	S1	An ability to identify, formulate, and solve complex engineering problems by applying principles of Mechanical engineering, science, and mathematics
	S2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
	S3	An ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgement to draw conclusions
	S4	An ability to communicate effectively with a range of audiences.
		Values, Autonomy and Responsibility
V	V1	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
	V2	An ability to function effectively on a team, whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
	V3	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

The PLOs are published in the ME department web site.

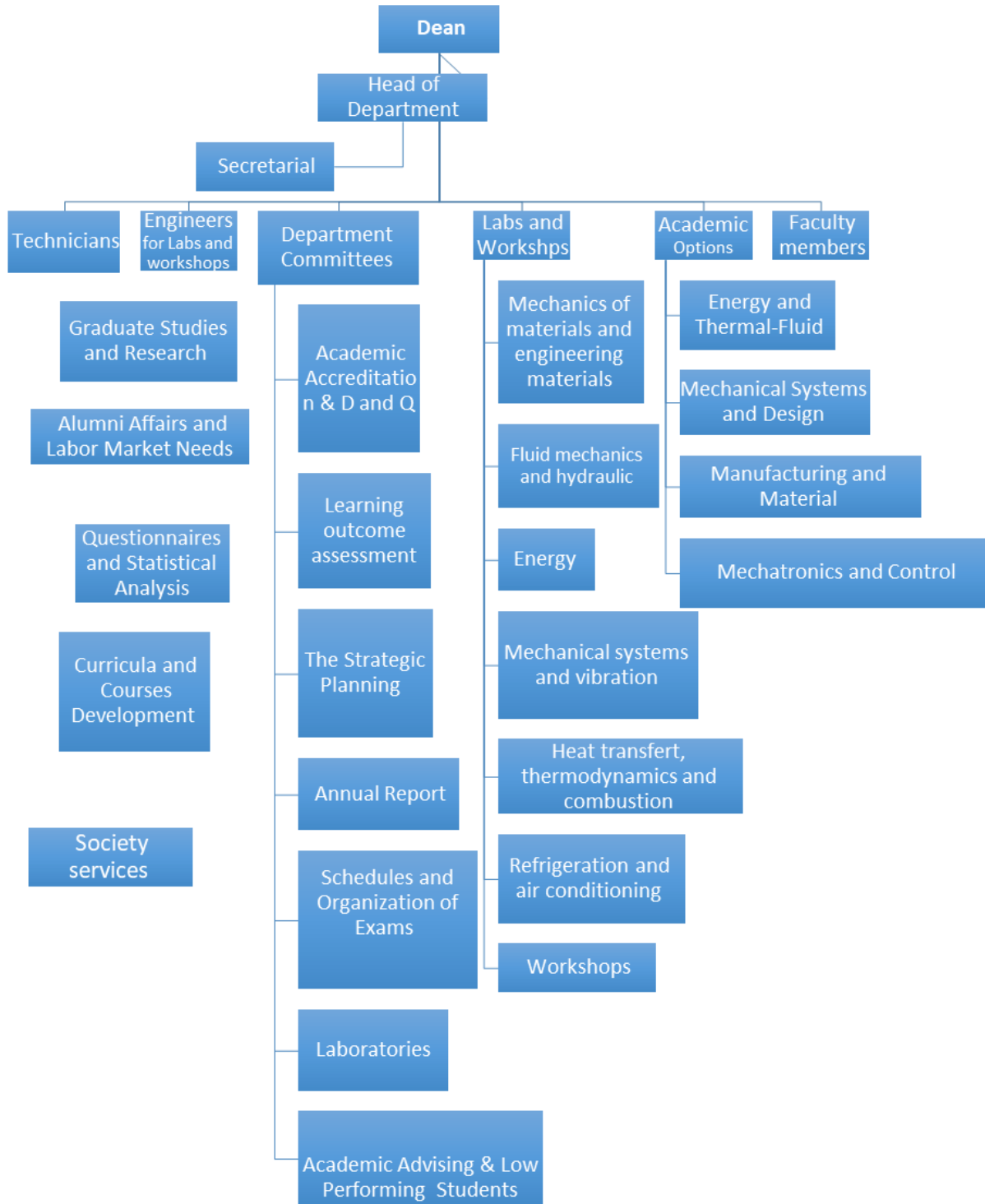
<https://www.ut.edu.sa/en/Faculties/engineering/Mechanical/Pages/default.aspx>

The assessment of program learning outcomes is performed every semester using pieces of students work especially designed to assess some specific course learning objectives and consequently specific program learning outcomes

3. The organizational Structure

The organizational structure of Mechanical Engineering Program is built in accordance with its vision, mission and goals and based on the efficiency of the human and financial resources in the program. For building the organizational structure, the program went through several stages, starting with defining the objectives and preparing detailed lists of activities by the program, its committees and units; and then defining the organizational relationships connecting them together at different levels vertically and horizontally, then defining the communication network that allows the exchange of information, then developing the organizational structure, and then preparing a guide that explains the competence, tasks and functional relationships, and finally monitoring the development process on a continuous basis.

Accordingly, the program organizational structure (Figure 1) shows the units, and committees and the relationship between them and lines of authority and the responsibility that links the parts of the program and the dimensions of the scope of supervision.



4. The quality Philosophy

The process of quality improvement involves assessing current levels of performance and the environment in which the programs are operating, identifying strategic priorities for improvement, and setting objectives, developing plans, implementing those plans, monitoring what happens and adjusting if necessary, and finally, assessing the results achieved. These steps involve a repeating cycle of planning and review. Major plans may involve a sequence of activities over several years, with several steps to be taken and the results of each step assessed at stages within that long term plan. While the monitoring should be continuous, there are normally two time periods when more formal assessments take place; one is annual with monitored performance and adjustments made as required, and the other is on a longer cycle in which major reviews are undertaken. Issues related to quality assurance and accreditation assessments should be planned to coincide with the external reviews for accreditation and re-accreditation conducted by the NCAAA or the ABET accreditation cycle.

Program Planning, implementation, delivery, and reporting

UT published the first version of the procedural guide for programs and study plans in the academic year 2014/2015. The second updated version was published in 2019/2020 and the third updated version was released in 2021. The guide contains all procedures for the programs' establishment, accreditation, forms, and all other procedures. All programs in UT should be committed to UT policies, standards, and procedures that are published in the manual.

The Mechanical Engineering program is committed to the institutional policies, standards, and procedures in the design, development, and modification of the curriculum. Introduction of a new program in UT starts with assessing the needs for this program, followed by preparing a program specification document that specifies the main program objectives, learning outcomes satisfying the NQF domains, teaching strategies, and assessment methods to measure the PLOs.

All course specifications are then prepared according to the NCAAA standards and forms and

updated accordingly. Appropriate learning outcomes for each course as well as teaching strategies and assessment methods and the distribution of the course topics are developed. Courses are prepared to achieve program goals and learning outcomes. The teaching and learning methodologies followed in each course are according to those stated in the course specification, which is considered as a contract between the instructor and the students. Before starting of the course meeting or departmental council meeting is held to review and discuss all issues related to the course and the results of previous improvement plans, then plan for course delivery, check facilities and resources and distribute the tasks and responsibilities. Throughout the course; the course coordinator continuously monitors all course activities, ensuring the plan for delivery of the Course is followed and facilitates difficulties and overcome obstacles faced during its delivery, gathering evidences for completion of course file and completing the course report. After the final assessment and release of exam results a post departmental meeting is to discuss the results, item analysis and Course Evaluation Survey analysis, get feedback from instructors, and finalizing the course report and course file. The coordinator submits the course file and the course report enclosing recommendations for improvement and an action plan. The course reports are prepared using NCAAA forms and provide an opportunity for the instructors to highlight issues they experienced or noted related to the effectiveness of the planned teaching strategies, and the extent to which the intended learning outcomes had been achieved. Students results in course reports can be updated after the release of the exam results.

The ME program regularly evaluates the feedback from beneficiaries to ensure that the program is achieving its mission and goals. Feedback is provided to all faculty members, course coordinators and administration. The course and program reports are used annually to assess the quality of education and any obstacles facing the quality of this process. Proposed changes are presented, discussed, and approved according to the type and percentage of changes to the authorized level as stated in the UT procedural manual for programs and study plans.

The levels for approval changes in UT courses and programs are summarized in Table (1). Any modification in the program plan must be documented and approved. The ME program strictly

follows the university regulations in this concern.

The levels for approval changes in UT courses and programs are summarized in Table (1)

Intended curriculum changes	Final Level of Approval
Program Level	
Changes including a program's mission, objectives, title, program length (total number of years/levels/ hours), program learning outcomes, program specification, study plan, and adding co-requisites or prerequisites	UT Standing committee of programs and study plans
Changes in ordering of PLOs, program KPIs, course code	Administration of Academic Programs and Study Plans in UT.
Change in the facilities, operational plan, dropping program co- requisites or pre-requisites	Faculty Council
Course Level	
Changes in the title, credit hours, length of period for teaching, timing in the program plan, update of course specification affecting >25% of CLOs, language of teaching	Standing committee of programs and study plans in UT
Course code	Administration of Academic Programs and Study Plans in UT.
Changes in course policies and regulations	Faculty council
Course teaching strategies, <25% change in CLOs, textbooks, reference materials, updates in mechanical engineering knowledge in related topics, distribution of topics/weeks, methods for assessment; measurement and evaluation grading systems.	Department Council

Course Planning, implementation, delivery, and reporting

The Course coordinator is a leader of successful implementation of Integrated curriculum. At

faculty of engineering–Tabuk university, Course coordinator is responsible for ensuring effective management of the course, its conduction according to what is stated in course specification and ensure using teaching, learning and assessment strategies and the methods designed in course specifications to achieve the course learning outcomes and the aligned program learning outcomes. The course coordinator is also responsible for ensuring that delivery and management of the course follows Faculty and University educational policies and regulations. The course coordinator is responsible for maintaining, updating all course data and information (course specification, timetable, exam copies, course report etc.) to assure that this information will help other parties for governing program planning, implementation, and evaluation.

Responsibility of Course Coordinators and Instructors

- Actively participate in all course activities in all its phases (planning, implementation, evaluation, and improvement).
- Act professionally within the team.
- Chairing the course team and arranging for team meetings (Pre and post course meeting).
- Set the calendar of team meetings.
- Supervise all the tasks and activities of course team.
- Ensure that the course is conducted as scheduled with adherence to the schedule and teaching plan.
- Communicate regularly with the students to monitor any deviation from the teaching schedule.
- Ensure that all course documents are prepared and go through the appropriate approval procedures.
- Deal with questions and problems related to the course conduction and management.
- Ensure that all educational materials, resources, and facilities are ready when required for the students and teaching staff.
- Work with the relevant units/committees to create efficient systems to support the delivery of the course

- Ensure that the course is being run in accordance with general faculty and university guidelines
- Ensuring that all academic staff teaching the course are clearly and well informed by what is required from them through group and/or individual meetings as appropriate.
- Ensure that the students are oriented with the course learning outcomes, contents, teaching and learning strategies, assessment methods, required educational resources, student support and counselling and their roles in course evaluation and improvement.
- Clarifying the course requirements and the assessments methods for the students at the beginning of teaching every course
- Provide ongoing guidance to teaching staff of the course and deal with any problems that rise.
- Provide ongoing guidance to the students and deal with any questions and problems.
- Monitor the progress of the course and provide feedback to teaching staff and the students if required.
- Monitoring the commitment of the teaching staff to implementing the teaching strategies and the approved assessment methods mentioned in the course specification.
- Encourage instructors to exchange ideas and provide support for each other.
- Clarifying the requirements of students' attendance in the course and monitoring the extent of their commitment
- Monitoring the attendance and counselling for their better performances
- Preparing and updating course documents and materials
- Update course specification based on previous course report, NCAAA templates and guidelines, and recommendations and feedback of quality and development unit.
- Put and follow up course timetable including all teaching and practical training activities besides teaching and simulation session.
- Updates student's study guide, exam blueprints and active teaching materials
- Implement and monitor course improvement plan.
- Assuring high quality student assessment
- Setting up clear plan for post exam tasks as marking and correction of exam papers, item

analysis, discussion of the students' results, approval of the student grades and finally set a recommendation for improvement.

- Collecting the feedback on the course from a variety of sources, including students through electronic surveys, teaching staff, and other staff, to identify areas for improvement, both in terms of syllabus and materials design and administrative systems.
- Measurement of achievement of CLOs and verify the students' achievement levels, their grades distribution, and their program completion rate in coordination with quality and development unit.
- Collecting the data essential for preparation of course report.
- Analyzing the feedback and statistical data and report on the course
- Identifying the training needs related to the course

5. Program Quality Assurance and Review Cycle

Course Level

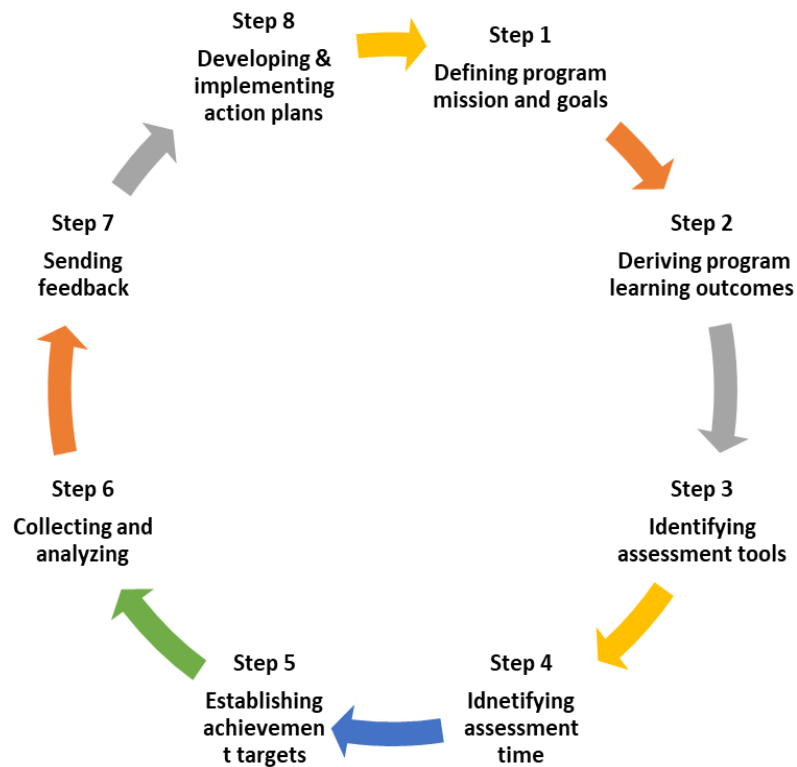
At the end of each course, the course coordinators submit the course files and course reports on the NCAAA forms. The minimum requirements for course evaluation should include a summary and analysis of the final marks of students with comments on grade distribution, item analysis, measurement of the achievement course learning outcomes (CLOs), effectiveness of planned teaching and assessment strategies for CLOs, course evaluation by students and other evaluators, and an action plan for improvement that may include rising issues or proposals for change.

1. Course reports are prepared by the course coordinators on NCAAA forms.
 2. The program accreditation, quality and development committee review the submitted course reports and check their completion and prepares a collective report on the plan of improvement in the submitted reports.
 3. The collective report and all course reports are approved by the department council meeting.
 4. The Course Reports are also submitted electronically to the Deanship of Development and Quality through Meyar Plus.
 5. The deanship of development and quality revises all the submitted reports and ensures that they fulfill the requirements of program accreditation and then submits them to the higher standing committee of academic accreditation and quality assurance.
1. The higher standing committee of academic accreditation and quality assurance revises the course reports and ensures the fulfillment of the CLOs and sends its recommendations to the deanship of quality and development.
 2. The deanship of development and quality sends the recommendation to the program coordinator for follow up.
 3. The program coordinator sends the recommendations to the concerned departments, course instructor, and committees for execution, and follow up of implementation of the improvement plan with supporting entity if needed. The results are recorded in the

course report of the next academic year.

Program Level

The quality management of the program is implemented through the PDCA cycle and monitored on a regular basis using an appropriate evaluation mechanism in order to support the continuous improvement of program and its activities and ensure that it is achieving its mission, goals and learning outcomes. Program level quality assurance is ensured through PLO analysis, cohort Analysis, Result analysis and KPI analysis at the end of every year.



Steps of the Program Assessment Process.

1. The course coordinators submit the finalized approved course reports to the Accreditation, Quality, and Development
2. The accreditation, quality and development committee forms a team and puts and

- approves the operational plan for writing the annual program report (APR). The operational plan encloses the distribution of tasks, the coordination of meetings, writing and finalization of the APR. The APR summarizes the quality of the program performance and sets action plans for improvement of the educational process and other processes.
3. The accreditation, quality and development committee revises and approves the APR and submits it to the department council for approval and submission to the faculty council.
 4. The faculty council discusses the APR, approves it, and submits it to the deanship of quality and development.
 5. The deanship of quality and development revises the APR and ensures its fulfillment for the requirement of program accreditation and submits it to the higher standing committee of academic accreditation and quality assurance.
 6. The higher standing committee of academic accreditation and quality assurance revises the completion of measurement of the PLOs and sends its recommendations to the deanship of quality and development.
 7. The deanship of quality and development sends the recommendations to the program coordinator and follows their implementation.
 8. The program coordinator sends the recommendations to the concerned entity.
 9. The accreditation, quality and development committee follows the execution of the improvement plans and the percentage of achievement of the improvement plans is reported in the APR of the next year.

Table 2: The Quality assurance Procedures at the course and Program level

Activity Name	End of Course	Annually	Responsibility
Course Evaluation Survey	√		Course Instructor through the Meyer Plus Platform
Course Report finalization	√		Course Coordinator

Course Binder Submission	√		Course Coordinator
Student Experience Survey		√	accreditation, quality and development committee
Program Evaluation Survey		√	accreditation, quality and development committee
Staff Satisfaction Survey		√	accreditation, quality and development committee
Employer Evaluation Survey		√	accreditation, quality and development committee
Alumni Evaluation Survey		√	accreditation, quality and development committee
Academic Advising Survey		√	Academic Advising Committee
Operational Plan report		√	accreditation, quality and development committee
Program KPI Report Preparation and Analysis		√	accreditation, quality and development committee
Annual Program Report Preparation		√	accreditation, quality and development committee
Annual Program Report Revision		√	Deanship of D&Q
APR and Course Reports approval		√	Faculty Council
Actions Plan Preparation and Distribution		√	accreditation, quality and development committee
Actions Plan Execution Assessment		√	Program Chair
Course Evaluation Survey	√		Course Instructor through the Meyer Plus Platform

Table (3): Timeframe of Program Evaluation

Activity Name	Monthly	Start of the Course	End of the Course	Annually	Every Accreditation Cycle
Committee meetings	√				
Departmental council meetings	√				
Faculty council Meeting	√				
Course Binder			√		
Course Evaluation Surveys			√		
Course Reports			√		
Needs Assessment and Checking the Resources				√	
Teaching Plan and Schedules				√	
Surveys (Student Evaluation Survey (SES), Program Evaluation Survey (PES), Alumni Evaluation Survey (AES), Employer Evaluation Survey (EES), Learning Resources Satisfaction Survey (LRSS))				√	
Program KPI Report and Analysis				√	
Operational plan Report and Analysis				√	
Stakeholders' surveys Report and				√	

Analysis					
PLOs & GAs measurement, analysis, report finalization with the improvement plan				√	
APR & the Improvement Plan				√	
Course reports and APR Revision/Recommendations by Deanship of D&Q				√	
Improvement Plan Distribution, Execution and Assessment				√	
Advisory committee meetings and recommendations				√	
Independent Program Review (SSRP)					√
Review of Program & course Specifications and LOs and study plan				√ (Internal review) (Minor change)	√ (External review) (Major change)
Program mission, goals, GAs and operational plan					√
Program SWOT Analysis Preparation and Reporting					√

Self-Evaluation Scale					√
Self-Study Report of the program (SSRP)					√
Committee meetings	√				
Departmental council meetings	√				

Table (4): Program Evaluation Matrix

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Effectiveness of teaching and assessment methods	Students, Alumni, faculty, employers	Exam results and Course reports PLOs achievement APR Program leaders-students meeting PES AES EES SES National exam results	End of each course Annually

Learning resources	Students, Alumni, faculty, employers	Course reports CES APR PES AES EES LRSS	End of each course Annually
Overall quality of the program	Students, Graduates, Alumni, Faculty, Employers, Advisory committee	Course reports APR Operational plan report KPIs reports Program goals report PLOs report Stakeholders survey report Advisory committee meetings	Annually

6. Key Performance Indicators (KPIs) and Benchmark

KPIs are specific forms of evidence used by the faculty to provide evidence and measure the of quality performance. The KPIs are one of the most important tools for assessing the quality of academic programs according to the criteria and rules of the NCAAA and are among the most prominent practices that contribute to decision-making and follow-up processes and continuous development and improvement. The NCAAA has identified 17 KPIs at the program level all of which are in line with the

evolving program accreditation standards. These indicators are the minimum to be periodically measured, and the academic program can use additional performance indicators if it believes they are necessary to ensure the quality of the program. One program KPI is added to the 17 KPIs of the NCAAA as it is believed to add valid information for assessing and evaluating the performance of the ME program.

1. Levels of Each KPI

It is expected that the program measures the KPIs with benchmarking using the appropriate tools, such as (Surveys, Statistical data, etc.) according to the nature and objective of each indicator, as well as determining the following levels for each indicator:

a) Actual performance

Refers to the finding outcome determined when the KPI is measured or calculated. It represents the actual reality of the present situation. A finding benchmark is also an internal benchmark.

b) Targeted performance level:

Refers to the anticipated performance level or desired outcome (goal or aim) for a KPI. A target benchmark is also an internal benchmark

c) Internal reference (Internal benchmark):

Refer to benchmarks that are based on information from inside the program or institution. Internal benchmarks include target or finding benchmark data results from previous years.

d) External reference (External benchmark)

Referring to benchmarks from similar programs that are outside the institution, it refers to other institutions (national or international).

e) New target performance level

Refers to the establishment of a new or desired performance level or goal for the KPI that is based on the outcome of the KPI analysis.

2. Selection of KPIs:

The KPIs are used for the program evaluations. A report is prepared annually describing and analyzing the results of each indicator. For each KPI, an acceptable target level to be achieved is set based on the program strategic goals, the comparative data of the internal and external benchmarking, with the intention to gain a performance growth with a minimum rate of 5% annually.

For each KPI the following values are measured:

Target KPI: which is determined according to the KPIs measurements of the internal and external benchmarking. Hence, it is the new target KPI of the former academic year.

Actual KPI: which is the actual level of the current year performance.

New target KPI: which is determined in consideration of the actual benchmark.

KPI Analysis:

Refers to a comparison and contrast of the benchmarks to determine strengths and recommendations for improvement.

- For the achieved target KPI level, a holding of the new targeted level is kept for an additional year to establish and maintain the good practice before setting an increment of the new target KPI.
- A 5% growth rate is considered acceptable improvement of the practice when setting a new target KPI level.
- If the target is not achieved so the previous target will be held as a new target for the year after, with investigating the reasons and delineating a plan for improvement to reach the targeted performance.

3. Sources of data:

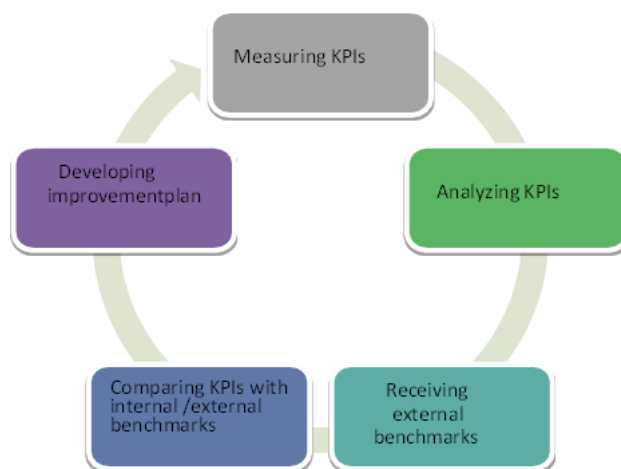
- The ME program operational plan reports.
- Reports on stakeholder surveys
- Program evaluation survey (PES).
- Courses' evaluation surveys (CES).
- Student experience survey (SES).
- Employer Evaluation survey (EES).
- Stakeholder satisfaction with learning resources report.
- Official students' records obtained for the university secured internal system (e- register).
- Students marking of the National progress test
- ME program staff university records from human resources.
- Scopus and ISI databases.

4. Data analysis methodology:

All data analysis is performed using Microsoft Excel for Microsoft 365. KPIs are presented as one of the following:

- Weighted mean and scored on a scale of 5 considering (3/5) as a cut-off level of satisfaction
- A proportion
- A percentage of performance.

The outcome of all KPIs values is presented as a percentage to calculate the final performance of the ME program indicators for the academic year of interest. Rates of growth (increment) or decline (decrement) are calculated in the comparative and trending analysis of the current performance with the internal and external benchmarking



KPIs annual assessment cycle

Code	Indicator	Goal	Time for measurement	Data Measurement Provider	Measurement Responsibility	Measurement Tools
KPI-P-01	Percentage of achieved indicators of the program operational plan objectives	Measuring the quality of program performance in all axes	Annually at the end of academic year	All committees	Head of the program	Operational plan template Completion rate report template
KPI-P-02	Students' Evaluation of quality of learning experience in the program	Measuring the educational quality of the program	Annually at the end of the academic year	accreditation, quality and development committee	Head of accreditation, quality and development committee	Program Evaluation Survey
KPI-P-03	Students'	Measuring	Annually at	accreditation	Head of	Course

	evaluation of the quality of the courses	the educational quality of the program	the end of academic year	n, quality and development committee	accreditation, quality and development committee	Evaluation Survey
KPI-P-04	Completion rate	Measuring the educational quality of the program	Annually at the end of academic year	Academic Affairs Coordinator	Head of accreditation, quality and development committee	Statistical data and analysis
KPI-P-05	First-year students retention rate	Measuring the educational quality of the program	Annually at the end of academic year	Academic Affairs Coordinator	Head accreditation, quality and development committee	Statistical data and analysis
KPI-P06	Students' performance in the professional and/or national examination	Measuring the educational quality of the program	Annually at the end of academic year	Head of the program	Head of the program	Statistical data and analysis of progress test results
KPI-P-07	Graduates' employability and enrolment in postgraduate programs	Measuring the quality of graduates <Characteristics, and the extent of employers' satisfaction, and the labor market's need for them	Annually at the end of academic year	Head of the program	Head of the program	Statistical data and analysis
KPI-P-08	Average number of students in the class	Measuring the quality of educational facilities	Annually each academic year	Academic Affairs Coordinator	Head of the accreditation, quality and development committee	Statistical data and analysis
KPI-P-09	Employers evaluation	Measuring the	Annually each	accreditation, quality	Head of the accreditation,	Employer Evaluation

	of the program graduate proficiency	quality of graduates (Characteristics and employers)	academic year	and development committee	quality and development committee	Survey
KPIP-10	Students' satisfaction with the offered services	Measuring the quality of support for students	Annually each academic year	accreditation, quality and development committee	Head of the accreditation, quality and development committee	Program Evaluation Survey
KPI-P-11	Ratio of students to teaching staff	Measuring the quality of education elements	Annually at the end of academic year	Academic Affairs Coordinator	Head of the accreditation, quality and development committee	Statistical data and analysis
KPI-P-12	Percentage of teaching staff distribution	Measuring the quality of education elements	Annually at the end of academic year	Academic Affairs Coordinator	Head of the accreditation, quality and development committee	Statistical data and analysis
KPI-P-13	Proportion of teaching staff leaving the program	Measuring faculty's satisfaction with the educational environment	Annually at the end of academic year	Head of the program	Head of the program	Statistical data and analysis
KPI-P-14	Percentage of publications of faculty members	Measuring the quality of the axis of scientific research	Annually at the end of academic year	Scientific Committee	Head of Scientific Committee	Statistical data and analysis
KPI-P-15	Rate of published research per faculty member	Measuring the quality of the axis of scientific research	Annually at the end of academic year	Scientific Committee	Head of Scientific Committee	Statistical data and analysis
KPI-P-16	Citations rate in refereed journals per	Measuring the quality of the axis of scientific	Annually at the end of academic year	Scientific Committee	Head of Scientific Committee	Statistical data and analysis

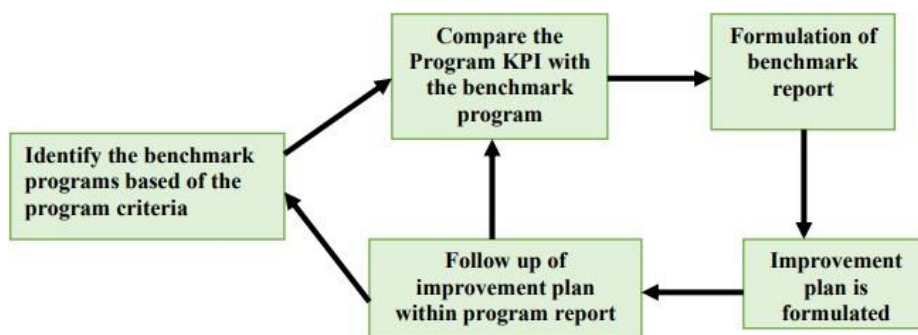
	faculty member	research				
KPI-P-17	Satisfaction of beneficiaries with the learning resources	Measuring the quality of learning resources	Annually at the end of academic year	accreditation, quality and development committee	Head of accreditation, quality and development committee	Program Evaluation Survey (PES) Student Experience Survey (SES) Course Evaluation Survey (CES)

Operational Plan Additional KPI Data BSc Mechanical Engineering Program

KPI#	KPI
PG1.1	Evaluation of the Program Curriculum and Learning outcomes by the stakeholders Survey
PG2.3	No. of patent proposal and applications submitted by the program in a calendar year
PG2.4	No. of research projects and grants applied by the program in a calendar year
PG3.1	No. of Awareness programs arranged for sustainable practices in a academic year
PG3.2	No. of community service programs organized by the program

7. Benchmarking and Improvement Cycle

It is a systemic and continuous process for measuring the program performance by comparing it to another program within or outside this university to identify the causes of the gap and work to address them and reach the best performance. Benchmarking is a vital process for maintaining the high quality of performance of any program and ensure continuous quality improvement (Fig.4). It allows for comparing the performance of various aspects of the program with respect to the good practices recommended by the NCAAA.



KPI Improvement Cycle

The Importance of Benchmarking:

1. Rationalization of expenditures.
2. Providing continuous learning opportunities.
3. Provide an opportunity to move internally and externally towards better models.
4. Providing cooperation opportunities between local organizations or units.
5. Adopting an organizational culture aimed at solving problems.
6. Assisting the foundation in precisely defining the gap between its performance and that of the leading institutions in its field of work.
7. It helps to provide the appropriate climate and enhances the desire for leadership of the institution and its employees to adopt a policy of change towards all that is better and new.
8. Helping define critical processes, give them the necessary attention and priority in implementation, and actively contribute to developing individual and group creativity.
9. It actively contributes to increasing the chances of achieving additional benefits for the program.
10. The external focus of the benchmarking method creates external competitive measures that necessarily increase the efficiency and effectiveness of internal performance quality measures and makes them more competitive.

8. Stakeholders Surveys

The relationship between stakeholder's satisfaction and program sustainable growth and success is investigated focusing on the importance of a firm's relationships with critical stakeholders that may lead to better performance, as program while integrating business and societal considerations create value for their stakeholders. However, it is of most importance that top management actively leads this approach and that the governance bodies of the organizations support and check that this really happens. There are different types of surveys for all program stakeholders.

Main Principles

There are several general principles that should be followed if student surveys are to be as useful as possible.

1. It must be made clear to students that all survey responses are anonymous.
2. Surveys should include common questions to enable them to be used for comparisons within

departments and between courses.

3. Some open-ended questions should be included to permit respondents to comment on additional matters of concern.
4. In addition to several individual items relating to matters considered important, surveys can include one or two summary items that can be used as general quality indicators.
5. To be used for benchmarking quality between programs the surveys should be distributed in similar ways and at similar times and comparisons should be made between comparable institutions.
6. Questions should be consistent over time (normally at least three years) so that valid trend data can be obtained.
7. The validity of responses depends on having a reasonable response rate. Normally at least 50% is essential. To encourage participation:
 - a) Surveys should not be overused.
 - b) Use should be made of the responses, and summary reports and indications of action taken in response made available.
 - c) The surveys should not be too long (a maximum of 20 to 25 items plus a small number of open-ended items is usual).

Recommended Surveys

Students and staff are the principal customers of the education system and surveys of their opinions are one of the most important sources of evidence about quality in higher education. Other stakeholders should be considered, they can provide very good insight about the outcomes of the program. They can provide very useful suggestions for improvement that should be considered in the quality cycle for improvement as applied to individual courses, programs, and institutional planning.

Type of surveys used:

1. **Course Evaluation Survey (CES):**
 - a) A course evaluation survey is distributed at the end of each course. It is recommended that this survey be distributed in each course once each year.
 - b) The survey does not directly assess the quality of teaching by individual instructors. However, the evaluation of the course is seen as a reasonable measure of the quality of teaching in a way that minimizes personal issues that could inhibit responses from students.

- c) The survey asks questions about several aspects of each course. The final question is intended to provide a summary question that might be used as a general quality indicator.

2. Student Experience Survey (SES):

- a) This is intended as a general survey that is distributed to all student's mid-way through their program (in between phase 2 and phase 3) of ME program.
- b) The survey deals with the student's life at the institution including both major elements of the program in which they are enrolled and several general items relating to services and facilities. As for the other surveys the final question is a summary item that might be used as a general quality indicator.

3. Program Evaluation Survey (PES):

- a) This survey is conducted annually. It is intended for use at the time students have finished their program and are about to graduate. It is recommended to be distributed shortly before the final year classes are finished so their opinion of the total program at that stage can be assessed.
- b) The questions include several items about the program itself together with some items similar to those in the SES that deal with their life as a student at the institution. As for the other surveys the final question is a summary item that might be used as a general quality indicator.

4. Alumni Evaluation Survey (AES)

- a) A survey of alumni is conducted annually. The target alumni are those graduates from the last year earlier and 3 years earlier.
- b) This instrument captures quantitative rankings about their experience in the program and PLOs, their achievement in FE exam, enrolment in post-graduate program and employability.

5. Employers Evaluation Survey (EES)

This survey is conducted an annual basis aiming to assess the level of satisfaction among employers about the outcomes of the program and also used to assess the PLOs.

6. Learning Resources Satisfaction Survey (LRSS)

This annual survey is divided into two sections. The first section is intended to collect data on the adequacy of learning resources, while the second section is intended to collect data on the diversity of learning resources. The survey is aimed at the program's primary stakeholders, which include Faculty, Alumni, Employers, Advisory Board, and Students.

Response Scale: It is recommended that each item in the surveys be responded to on a five-point scale. The recommended scale is:

1. Strongly agree (5)
2. Agree (4)
3. Neutral (or undecided) (3)
4. Disagree (2)
5. Strongly disagree (1)

Stakeholders' Survey Plan

Survey	Area of Evaluation	Target Group	Distribution Responsibility	Distribution Timing	The Uses of the Survey	The Target of the Response
CES	Course quality	Students	Course coordinator	End of the Course	-KPI-P-03 Average student overall rating of course quality on five-point scales -Course report	Applying to all program courses With a response rate of not less than 50% of the sample
SES	The student's academic life in the educational institution, including the basic components of the program in which the student is registered	Students who have passed half of the program's duration	Accreditation, Quality, and Development	Through some selected courses, midway through the curriculum	KPI-P-10 Student satisfaction with services provided KPI-P-17 Beneficiaries' satisfaction with learning Resources	A response rate of not less than 50% of the sample

Survey	Area of Evaluation	Target Group	Distribution Responsibility	Distribution Timing	The Uses of the Survey	The Target of the Response
PES	Final year students' satisfaction with program, services, facilities, and program management	Final year students of the program	Accreditation, Quality, and Development	Through some selected courses, midway through the curriculum	KPI-P-02 Students' evaluation of the quality of learning experiences in the program KPI-P-10 Student satisfaction with services provided KPI-P-17 Beneficiaries' Satisfaction with Learning Resources	A response rate of not less than 50% of the sample
AES	Alumni satisfaction with the program	Alumni	Accreditation, Quality, and Development	At least 6 months after their graduation	KPI-P-02 Students' evaluation of the quality of learning experiences in the program KPI-P-10 Student satisfaction with services provided	With a response rate of not less than 50% of the sample
EES	Employers' satisfaction with program outcomes	Employers	Accreditation, Quality, and Development	It is submitted to the employers one year after the student's graduation.	KPI-P-09 Employers' assessment of the competency of program graduates	With a response rate of not less than 50% of the sample

Survey	Area of Evaluation	Target Group	Distribution Responsibility	Distribution Timing	The Uses of the Survey	The Target of the Response
LRSS	Satisfaction of the beneficiaries with the learning resources	Students, Faculty, Alumni, Advisory Board	Quality Committee	This survey is sent to the stakeholders anytime during an academic year	KPI-P-17 Stakeholders' assessment of the level of satisfaction on the learning resources and the diversity of the learning resources	With a response rate of not less than 50% of the sample size of 25.

Prepared by: Academic Accreditation & Development and Quality committee